

Alerts, Notices, and Case Reports

Eosinophilic Meningitis Associated With Coccidioidomycosis

YAHYA ISMAIL, MD
EDWARD L. ARSURA, MD
Bakersfield, California

COCCIDIOIDAL MENINGITIS represents an important cause of morbidity and mortality in the regions where *Coccidioides immitis* is endemic. Unfortunately, the diagnosis of coccidioid meningitis may not be easily determined, especially during the early workup of a patient if the disease is unsuspected. Untreated, it leads to progressive debilitation and eventually death.¹ In this report we describe the cases of three patients who presented with coccidioid meningitis and were found to have eosinophilic pleocytosis. This finding could be an aid in drawing clinicians' attention to this treatable condition.

Report of Cases

Case 1

The patient, a 42-year-old man, was seen because of worsening headache and drowsiness that progressed to coma over the course of three days. Two weeks before admission, he was treated with a course of oral antibiotic for pneumonia. At presentation, his temperature was 38.9°C (102°F). He was found to have nuchal rigidity, a positive Kernig's sign, and his level of consciousness was categorized as Glasgow coma scale 7. The rest of the physical findings, including those of the chest examination, were normal. A lumbar puncture revealed an increased opening pressure of 45 cm of water. The cerebrospinal fluid (CSF) glucose concentration was 1.4 mmol per liter (25 mg per dl; normal 2.8 to 4.4) with a blood glucose level of 5.4 mmol per liter (97 mg per dl); a protein of 1.26 grams per liter (126 mg per dl; normal <0.40); and a leukocyte count of $1,835 \times 10^6$ per liter (1,835 per μ l) with a total eosinophil count of 569×10^6 per liter, or 0.31 (569 cells per μ l, or 31%). The rest of the leukocyte differential consisted of lymphocytes, 0.46; neutrophils, 0.15; and monocytes, 0.08. The complement fixation (CF) test in the CSF yielded a coccidioid antibody titer of 1:4. The CSF culture was negative for *C immitis*. The peripheral blood showed a total eosinophil count of 300×10^6 per liter (300 cells per μ l) and a serum CF titer of 1:16.

The patient was started on a course of penicillin without any improvement. Two days later, following the reporting of complement in the CSF, a regimen of fluconazole was started at a dose of 400 mg daily. This resulted in gradual improvement, and he was discharged home after two weeks. Four weeks after discharge, a CSF examination showed a total leukocyte count of 505×10^6 per liter with a total eosinophil

count of 66×10^6 per liter (0.13), the rest of the leukocytes being mononuclear cells. He continues on a regimen of oral fluconazole, and his general condition and neurologic status are at baseline.

Case 2

The patient, an 18-year-old woman, was referred for the evaluation of fever for a week following a cesarean section. The fever persisted despite triple-antibiotic therapy and heparinization for the possibility of pelvic thrombophlebitis. On physical examination, she was found to have nodular lesions on her trunk and arm, which had first appeared a month before delivery. On histopathologic examination, a nodule showed noncaseating granulomata with *C immitis* spherules. The patient had a lumbar puncture, which showed an increased opening pressure, a glucose content of 1.5 mmol per liter (27 mg per dl), with a blood glucose level of 5.4 mmol per liter (98 mg per dl); a protein of 0.55 grams per liter (55 mg per dl); an increased total leukocyte count of 588×10^6 per liter with a total eosinophil count of 364×10^6 per liter, or 0.62; and a CF titer of 1:8. The rest of the leukocyte differential count was lymphocytes, 0.26; neutrophils, 0.11; and monocytes, 0.01. She had peripheral eosinophilia with a total eosinophil count of $1,476 \times 10^6$ per liter, and the serum CF titer was 1:256. She was treated with a regimen of 400 mg of oral fluconazole daily. She defervesced over a period of seven days and was discharged without any neurologic abnormalities. Four weeks after discharge, CSF analysis revealed a leukocyte count of 62×10^6 per liter with a total eosinophil count of 7×10^6 per liter, or 0.09, and a CF titer of 1:8. The remainder of the leukocyte differential showed 0.87 lymphocytes and 0.04 monocytes. The patient did not report any complications, and she is functioning normally.

Case 3

The patient, a 33-year-old man, was seen because of progressively increasing headache and photophobia after recovering from a flulike illness. On physical examination he was afebrile and alert without nuchal rigidity or other signs of meningeal irritation. A fundoscopic examination revealed no abnormalities. Otherwise the physical findings including the neurologic system were normal. A computed tomographic scan of the head was normal, and a lumbar puncture yielded clear CSF with glucose concentration of 1.2 mmol per liter (22 mg per dl) with a blood glucose level of 4.3 mmol per liter (78 mg per dl), a protein content of 0.78 grams per liter (78 mg per dl), increased leukocytes to 710×10^6 per liter with a total eosinophil count of 106×10^6 per liter, or 0.15, and a CF titer of 1:4. The peripheral blood showed a normal eosinophil count and a serum CF titer of 1:32. The patient was treated with a regimen of intravenous and intracranial amphotericin B. After a predetermined total dose of 4 grams of amphotericin B, he was continued on a regimen of 400 mg of oral fluconazole. Two weeks after discharge, a CSF analysis revealed a leukocyte count of 430×10^6 per liter with a total eosinophil count of 30×10^6 per liter, or 0.07. The remainder of the leukocyte differential was lymphocytes, 0.85, and monocytes, 0.08. On the most recent follow-up visit, no complications were noted, and the patient is functioning normally.

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From the Central California Heart Institute, Department of Medicine, Kern Medical Center, Bakersfield, and the Department of Medicine, University of California, Los Angeles, School of Medicine.

Reprint requests to Edward L. Arsura, MD, Department of Medicine, Kern Medical Center, 1830 Flower St, Bakersfield, CA 93305.

ABBREVIATIONS USED IN TEXT

CF = complement fixation
CSF = cerebrospinal fluid

Discussion

Finding eosinophils in the cerebrospinal fluid is an uncommon event, seen in less than 3% of all CSF specimens.² Furthermore, as this finding is seen in a limited number of conditions, it can be helpful in alerting physicians to the possibility of a specific diagnostic consideration,³ particularly when Kuberski's criterion of more than 10×10^6 per liter of eosinophils in CSF is used. Worldwide, the most frequent conditions associated with eosinophilic pleocytosis include helminthic infections, in particular infection with *Angiostrongylus cantonensis*, *Toxocara canis* and *Toxocara cati*, *Schistosoma* species, and *Paragonimus westermani*. Other central nervous system infections including *Mycobacterium tuberculosis*, *Histoplasmosis capsulatum*, *Toxoplasma gondii*, and rickettsial infections have been reported as causing eosinophilic pleocytosis. Rare but recognized causes include also neoplasms such as lymphoma and leukemias, allergic reactions to contrast agents, and drugs such as ibuprofen and ciprofloxacin.⁵⁻⁷ The patients we have described presented in a recent nine-month period during an outbreak of coccidioidomycosis in Kern County. They were diagnosed and treated at Kern Medical Center, which serves the southern San Joaquin Valley, historically an area endemic for *C immitis* infection. On literature review, we found that the association of eosinophilic pleocytosis in the CSF of patients with coccidioidal meningitis has been infrequently reported.⁸⁻¹⁰ We think, however, that this occurrence is much more common than has been previously reported, especially in light of the fact that three cases with this finding have been observed in a relatively short time. In addition, in a recent retrospective review of the records of 27 patients diagnosed at Kern Medical Center by a positive complement fixation test in the CSF during the past five years, we found that 8 (30%) of the patients had more than 10^6 eosinophils $\times 10^6$ per liter in the CSF (unpublished data). The major importance of this finding is that it provides a clue to the possibility of coccidioidal meningitis, which otherwise can be a diagnostic challenge. The diagnostic significance is more apparent when one considers the uniform mortality of the disease if the diagnosis is overlooked.

In summary, the finding of eosinophilic pleocytosis in the CSF is of diagnostic value for coccidioidal meningitis, particularly outside the endemic area. This finding should alert clinicians to review the historical travel data and consider the appropriate serologic and CSF testing. Further studies are needed to find the frequency of this observation as well as its prognostic value and additional clinical importance.

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Successful Medical Treatment of an Infected Prosthetic Aortic Graft

PRISCILLA SIOSON, MD
RICHARD B. BROWN, MD
Springfield, Massachusetts

INFECTIONS OF prosthetic arterial grafts are uncommon but carry a substantial risk of morbidity and mortality.¹⁻⁵ Death rates are 16% to 75%, depending on the site of involvement, and limb amputation rates are 11% to 75%.^{3,6-8} The ideal management of infected arterial grafts is surgical excision of the involved segment, the placement of an alternative vascular supply, and systemic antibiotic therapy.^{3,9-13} In several recent articles, less radical surgical techniques have been proposed, such as local debridement with wide incision, continuous irrigation with povidone-iodine and antibiotic solutions, and the use of gentamicin beads.^{2,4,12,14} Rarely has medical therapy after percutaneous diagnostic aspiration or catheter drainage resulted in long-term control or apparent cure of infection. We report a case of periaortic graft infection associated with bacteremia caused by *Bacteroides* species that was successfully treated by percutaneous aspiration and prolonged antibiotic therapy.

Report of a Case

The patient, a 67-year-old woman with coronary and peripheral vascular disease, had an aortoiliac woven Dacron graft placed for a ruptured abdominal aortic aneurysm in August 1987. Her postoperative course was complicated by nosocomial pneumonia and multiple intra-abdominal abscesses requiring three additional operations. A computed tomographic (CT) scan three months after the initial operation showed total resolution of the abscesses and an intact graft.

The patient did well until 31 months later when she was readmitted for fever as high as 39.4°C, fatigability, and low back and left flank pain. She had a blood pressure of 158/84 mm of mercury, a pulse rate of 88 beats per minute, respirations 24, and temperature 39.3°C (103°F). On physical examination she had mild tenderness in the left lower quadrant, normoactive bowel sounds, no pulsatile mass, no hepatosplenomegaly, and several well-healed surgical scars. Peripheral pulses were diminished in the right lower extremity. Initial laboratory data included a leukocyte count of 11.5×10^9 per liter (11,500 per μ l), a hemoglobin of 135 grams per liter (13.5 grams per dl), and hematocrit 0.40 (40%). The erythrocyte sedimentation rate was 115 mm per

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From the Infectious Disease Division, Baystate Medical Center, Springfield, and the Tufts University School of Medicine, Boston, Massachusetts.

Reprint requests to Richard B. Brown, MD, Infectious Disease Division, Baystate Medical Center, 759 Chestnut St, Springfield, MA 01199.